



Approved

E.A. Krasavin
Director, Laboratory of Radiation Biology, JINR
24 June 2019

MINUTES
of the 131st Meeting of the Science and Technology Council (STC)
of the Laboratory of Radiation Biology (LRB)
24 June 2019

STC members present (11 out of 13): O.A. Bakerin, A.V. Boreyko, A.N. Bugay, V.N. Chausov, N.A. Koltovaya, M.M. Komochkov, O.V. Komova, I.V. Koshlan, V.A. Krylov, V.N. Lisy, G.N. Timoshenko

AGENDA

I. Election of the LRB STC Chairman

Due to the excused absence of the LRB STC Chairman V.E. Aleinikov (on vacation), M.M. Komochkov has been proposed to preside over the current meeting of the LRB STC.

Vote: unanimous (11 for).

II. Nomination for the position of the LRB Director: a proposal to the 126th Session of the JINR Scientific Council

The following two reports have been heard:

1. A proposal by the LRB Director, RAS Corresponding Member E.A. Krasavin, on A.N. Bugay's nomination for the position of the LRB Director

Alexander Nikolaevich Bugay has been working at the LRB for more than 10 years (since 2008). In June this year, he successfully defended his Doctoral thesis at Lomonosov Moscow State University. At the beginning of his research at the LRB, he focused on modeling radiation mutagenesis processes in prokaryote cells. The results of this research were published as a series of works in high impact factor journals, including the *Journal of Theoretical Biology*. Jointly with A.Yu. Parkhomenko, he developed an original mathematical approach to the description of radiation-induced mutagenesis in bacteria. These studies formed the basis of O.V. Belov's Candidate's thesis. Later, together with the staff of the Mathematical Modeling Sector, which he headed, he addressed problems of the evaluation of the space radiation exposure risk during deep space flights — first of all, by modeling radiation-induced disorders of the central nervous system. In collaboration with the LRB's Mongolian colleagues, research was performed on the specifics of energy deposition in charged particle tracks and molecular damage formation — using the GEANT4-DNA software package. A molecular dynamics

analysis was done of the disorders in the functioning of the synaptic NMDA receptor's protein structures and the influence of these disorders on the functioning of specific neurons and neural networks. The results of these studies are important for understanding the development mechanisms of the neurodegenerative diseases.

In parallel with this research, A.N. Bugay continued to work on his Doctor's dissertation, which was concerned with the action of terahertz radiation on molecular structures. This issue is increasingly relevant because the electromagnetic contamination of the environment is growing, and will be yet more relevant due to the future introduction of the 5G communication technology. All A.N. Bugay's research on the action of ionizing radiation of different quality, as well as non-ionizing radiation, on the genetic structures of living systems is focused on the mechanisms of the mutagenic action of this physical factor.

I believe that A.N. Bugay deserves to be nominated for the position of the LRB Director, and in this capacity he will provide the continuity and successful development of the Laboratory's research.

2. A report by A.N. Bugay, Dr. Phys.-Math., on the LRB Development Program

A.N. Bugay spoke about the LRB Development Program, which provides for fundamental and applied research in radiobiology and astrobiology using methods from molecular radiobiology, cytogenetics, physiology, and neurochemistry and mathematical modeling. The fundamental importance was stressed of ascertaining the molecular mechanisms of radiation-induced damage in the central nervous system. In terms of practical value, solving this problem will enable identification and prediction of the development of ionizing radiation-induced cancer and neurodegenerative pathologies. Based on this, it is planned to evaluate the radiation exposure risk of deep space flights and propose the corresponding protection measures, as well as to elaborate innovative methods of the radiation therapy of malignant neoplasms.

Questions

G.N. Timoshenko, Dr. Phys.-Math.: Is your program consistent with the LRB's plans for the period up to 2030, which have been developed by the Laboratory's current Directorate?

A.N. Bugay: The program aims at the successful realization of these plans, taking into account the development of the Laboratory's infrastructure and the Laboratory's consolidating role in biological and medical research conducted at the Institute's Laboratories and under international projects.

I.V. Koshlan, Cand. Biol.: Tell us in more detail about international cooperation plans.

A.N. Bugay: It is planned to continue the current research programs with the participation of JINR Member and Associated States as well as to establish new ties in promising fields. In this regard, the most important to the LRB will be its participation in the GSI/FAIR International Biophysics Collaboration, which was established to coordinate radiobiological and medical research at NICA, FAIR, RAON, ELIMED, and other existing and future facilities.

V.A. Krylov: Do JINR Member States support your program?

A.N. Bugay: Yes, It has already been supported by the Plenipotentiaries of Poland, Azerbaijan, and Mongolia. Responses from more JINR Member and Associated States are expected.

M.M. Komochkov, Cand. Phys.-Math.: As the Chairman of the LRB's Science and Technology Council, I have to ask a question about alternative candidatures. Are there any, and will our Laboratory nominate other candidates?

E.A. Krasavin: As far as we know, there have been no more official nominations as yet. But I believe the nomination of the only candidate for the position of the LRB Director — A.N. Bugay — is justified and consolidated.

Expressed opinions

G.N. Timoshenko, Dr. Phys.-Math.: Our Laboratory works in the fields that were laid at its foundation by Evgeny Alexandrovich [Krasavin]. On his initiative, the Department of Biophysics was established at Dubna University; its students are educated in the light of these ideas, and its alumni successfully work at the LRB. Therefore, of principal importance to our Laboratory is to maintain the status quo and continuity of generations. I am sure Alexander Bugay will meet this challenge; all the Laboratory's intended research will be continued; and the goals stated in the Laboratory's plans will be achieved. Of course, it is very important to keep the normal working atmosphere among the Laboratory's staff. In this regard, I think Alexander Bugay's human qualities make him a very good candidate. Moreover, this candidature follows our Institute's tradition of appointing a theoretician to the highest position. I ask the STC to support Alexander Bugay's nomination for the position of the LRB Director.

V.N. Lisy, Dr. Phys.-Math.: I believe this candidate deserves to be appointed Director of the Laboratory. I had been familiar with his scientific papers before I came to the LRB, but when got to know him closer, I was really impressed by his knowledge of both theoretical physics and biology. A broad range of interests in different fields of science is remarkable for any scientist; it is especially valuable asset of a candidate for the position of the Laboratory Director. I advise the STC members to support A.N. Bugay's nomination for the position of the LRB Director.

A.V. Boreyko, Dr. Biol.: No doubt Alexander Nikolaevich [Bugay] will be an excellent director, and the scientific aspect of his program is unquestionable. It should be remembered, though, that the Laboratory's interests must be properly represented and upheld at all levels of public relations. In this regard, I believe there will be an efficient alliance between Evgeny Alexandrovich [Krasavin] and Alexander Nikolaevich [Bugay]. They have long been fruitfully working together on all the specific issues of their fields of research. We hope Evgeny Alexandrovich [Krasavin] will be the Scientific Leader of the Laboratory, which will allow Alexander Nikolaevich [Bugay] to adapt smoothly to the Director's position and maintain the continuity and traditions of all the Laboratory's directions of research. I think we must support Alexander Bugay's nomination for the position of the LRB Director.

A.N. Koltovaya, Dr. Biol.: I am very pleased to note that Alexander Nikolaevich [Bugay] advises the Laboratory's researchers on any scientific issue. He is always ready to listen and express a valuable opinion, which is a very important quality of a prospective director. I am sure we must support his nomination for the position of the LRB Director.

III. Voting on the nomination for the position of the LRB Director

Motion: to hold an open vote on the nomination for the position of the LRB Director.

Vote: unanimous (11 for).

Motion: to nominate A.N. Bugay for the position of the LRB Director.

Vote: unanimous (11 for).

IV. Additions

The LRB STC Secretary has informed the STC members that an absentee vote was conducted among the absent STC members (E.A. Aleinikov and A.Yu. Parkhomenko). They support A.N. Bugay's nomination for the position of the LRB Director and ask their votes to be counted with the total voting results

Motion: to include the absentee voting results in the total voting results.

Vote: unanimous (11 for).

V. Resolution

The LRB STC meeting has resolved to nominate **A.N. Bugay** as a candidate for the position of the LRB Director.

Vote: unanimous (13 for).

M.M. Komochkov
Chairman, Science and Technology Council
Laboratory of Radiation Biology

I.V. Koshlan
Scientific Secretary, Science and Technology Council
Laboratory of Radiation Biology